DOCUMENT RESUME

ED 253 296 PS 014 523

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TITLE The Effect of Early and Extended Neonatal Contact on Mother-Infant Interaction.
PUB DATE 76
NOTE 80p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS Behavior Patterns; Hypothesis Testing; *Individual Characteristics; Interaction; Measures (Individuals); Models; *Mothers; *Neonates; Parent Attitudes; *Parent Child Relationship; Performance Factors; Social Environment; Theories
IDENTIFIERS Brazelton Neonatal Behavioral Assessment Scale; Coding; Dyadic Interaction Analysis; Infant Feeding; Qualitative Data; Quantitative Data; Social Interaction

ABSTRACT

In this study, 104 primarily indigent primiparous mothers from urban and rural areas and their healthy, full-term neonates were placed in one of four conditions during the normal postpartum lying-in period. Conditions were control, initial contact, rooming-in, and initial contact plus rooming-in. Dependent variables consisted of scores on the Brazelton Neonatal Behavior Assessment Scale, results of observations of the mother-infant dyad by the nursing staff, and data gained through assessment of mothers' perceptions of their neonates by means of a questionnaire. For both the neonatal assessment and the interaction observation data, results were found to fit a model contrasting dyads that received initial contact and dyads that did not. Nurse ratings produced no effects, while maternal perceptions inferred from the temperament scale yielded contrasts between rooming-in dyads and dyads not rooming-in, as well as contrasts between dyads that received initial contact and those that did not. Results were interpreted as indicating an interaction between method of assessment and choice of dependent variables. In addition, findings with respect to the direct measures (neonatal assessment and feeding observations) were construed as important evidence for the existence of a sensitive period following birth. Speculation regarding the process involved in initial contact was presented, and results were discussed in light of this possible mechanism. (Related materials are appended; these include a priori profiles for the Brazelton Scale, the Neonatal Unit Rating Scale Evaluation (NURSE), and Talking about My Baby, a modified version of W. Carey's Infant Temperament Scale. (RH)

THE EFFECT OF EARLY AND EXTENDED NEONATAL CONTACT ON MOTHER-INFANT INTERACTION

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THE EFFECT OF EARLY AND EXTENDED NEONATAL CONTACT ON MOTHER-INFANT INTERACTION

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August, 1976

Number of Words: 243

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ACKNOWLEDGEMENTS

It has been a long road. At nearly every point along the way I scarcely missed either tripping over or colliding with myself. Sometimes, I did not miss. Serendipity, however, was at my side, for there appeared some whose imaginations were captured by my exhibition. In the way of good psychologists, they studied it; they predicted it; they manipulated it. Though they were not able to extinguish my use of such words as "serendipity," their individual and collective influence has been the deciding factor in bringing me to this point. Where most merely obtain a degree, I also have received an education. This distinction I owe primarily to the personal interest of four people whom I have ordered in the ascending chronological sequence of my first encounter with each of them. I am very grateful for the substantial contribution to my education by Al Harrison and George Yonge of the University of California, Davis and Howard Sandler and Peter Vietze of Peabody College.

Randall Harley spent time reviewing and discussing this research and I am particularly grateful to him for providing this assistance on short notice. Susan Falsey produced a major revision of the computer program she had written for observational data in order to accomodate the shift to neonatal subjects. The assistance of her computer programming skills as well as her broad range of statistical competence contributed greatly to the management of the data.

The processing of the observation data involved countless problems that would have rendered any ordinary person helpless. It is because

Mary Lou Asche is an extraordinary person that these data reached the form summarized in this report. The arrangement and preparation of this manuscript was also a formidable task. Many could have adequately performed it, but very few could have achieved the standard of excellence set by Gloria Gannon Mason. The major part of the credit for the quality of the presentation of this paper belongs to Mary Lou Asche and Gloria Gannon Mason and I really appreciate it.

Susan Harrell stayed with the data collection of the observations while others fell by the way. Her perseverance in this effort has been my reward. Mrs. Robertson, Mrs. Goodwin, Ms. Binkley and Ms. Vaughn of the Nashville General Hospital nursing staff made personal sacrifices in time and inconvenience to assist in the process of this study.

The opportunity for access to the hospital nursery and maternity ward was provided by Bill Altemeier and Susan O'Connor.

This research was supported in part by Research Contract (5D08PE00387-02) from the National Institutes of Health Bureau of Health Manpower Education to Dr. David T. Karzon, Vanderbilt University Medical Center.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Introduction

Research in mother-neonate interaction suggests that contact between mother and newborn closely following birth facilitates a positive relationship between them. Data from animal studies indicate that this relationship is bi-directional, subsuming issues regarding newborn behavior directed to mother under the category of imprinting (e.g., Sluckin, 1965) while maternal behavior regarding her newborn is generally described in terms of sensitive or critical periods (e.g., Newton & Levine, 1968; Rheingold, 1963). However, as with many of the phenomena subject to research, the positive aspects of the neonatal period have been inferred from observations of disturbances in normal mother-neonate behavior. Specific to early contact phenomena, the importance of the postpartum period stems from the apparent relatedness of mothering disturbances and mother-neonate separation. Propinquity appears to be an important aspect of the inchoate relationship for both mother and neonate. Though a bonding disturbance does not occur always as a result of separation and the effect varies as a function of period and length of neonatal separation across species, preliminary data on the relationship between mothers and premature infants (Fanaroff, Kennell, & Klaus, 1972; Klaus & Kennell, 1970; Leifer, Leiderman, Barnett, & Williams, 1972) have been sufficiently compelling to warrant continued investigation of the human consequences of the contact phenomenon. Studies of premature infants have demonstrated consistently that opportunities for contact between these infants and their mothers

increased mothers' frequencies of looking at, smiling at, closely holding, and caressing their infants (Barnett, Leiderman, Grobstein, & Klaus, 1970; Klaus & Kennell, 1970; Leiderman, Leifer, Seashore, Barnett, & Grobstein, 1973). These findings, in light of ethological (Bowlby, 1969) as well as empirical (Robson, 1967; Robson & Moss, 1970) data, stand in support of a direct relationship between early, extended mother-neonate contact and the fidelity of the dyad.

Beginning with an ethologically oriented observation of mothers with their newborns, Klaus, Kennell, Plumb, and Zuehlke (1970) documented strong similarity in the behavior patterns of mothers of normal, full-term infants and mothers of premature infants. However, the timing of the occurrence of these similar behavior patterns was not at all alike; mothers of prematures were much slower in manifesting this behavior. Noting that prematurity results in an extended period of mother-neonate separation from birth to first contact, Klaus et al. (1970) hypothesized that the amount of contact between mother and neonate during the postpartum period influences the behavioral processes related to bonding, or the strength of the mother-infant relationship.

The hypothesis was initially tested by the first in a series of studies designed to assess the influence of early and extended contact on the relationship between mothers and their full-term, normal neonates (Klaus, Jerauld, Kreger, McAlpine, Steffa, & Kennell, 1972). Mother-infant dyads composing the treatment group were placed together for approximately 1 hour within the first 3 hours following birth as well as 4 additional hours during each day of the usual postpartum hospitalization period. In comparison to a control group of mothers and neonates

who were together only for a few minutes during feedings (the usual hospital policy), the treatment group demonstrated higher frequencies of eye-to-eye contact (enface), fondling, and soothing behavior. Treatment group mothers also voiced a greater reluctance to leave their infants and tended to support and attend their infants during pediatric examination. Longitudinal data on this sample revealed that the effect remained 1 year following birth (Kennell, Jerauld, Wolfe, Chesler, Kreger, McAlpine, Steffa, & Klaus, 1974). After 2 years, data indicated differences between groups in terms of maternal speech patterns when addressing her child (Ringler, Kennell, Jarvella, Navojosky, & Klaus, 1975). Ringler et al. (1975) have construed these latter findings as indicative of the association between early, extended contact and maternal sensitivity. Ringler et al. concluded that mothers who experience early, extended contact possess a "greater awareness of the growing needs of their children" (p. 143).

The overall results of this longitudinal research indicate measurable differences between mother-neonate groups who experienced differential amounts of mutual contact in the first days of their inchoate relationship. These group differences have been shown to exist during the neonatal period and infant ages of 1, 12, and 24 months. Prior to further interpretation of the observed effects, however, some of the major assumptions of this research is to be discussed.

Independent Variable

The relationship of time as a function of the contact phenomenon has been hypothesized to be both qualitative and quantitative. The qualitative nature of time concerns differences between immediate postpartum contact and later contact, holding that the period immediately

preceding birth is crucially important to the establishment of the bonding process which forms the basis of the mother-infant relationship. This construct is very closely related to the critical or sensitive period hypothesis and, relative to this research, is mother-oriented. In terms of quantitative time, research in the contact phenomenon has posited that (at least to the level of 6 additional hours per day of postpartum hospitalization) the more mother and neonate are together, the more likely a positive relationship (based on maternal behavior self-reports and observations). Design has not differentiated adequately these two aspects of temporality which have been operationally as well as theoretically incorporated into the research. Whether the result of a positive linear relationship, a critical period, or a combination of the two, it is imperative that continued research in this area focuses on solving the problem of when contact should occur and the amount necessary (cf. Gewirtz, 1972).

Dependent Variables

The research approach of Kennell, Klaus, and associates has been primarily mother-oriented. Measures have been based on observations of a mother's behavior toward her child during the lying-in period and pediatric examinations, self-reports of her involvement with the child, and (for the 2-year data point) analysis of her speech patterns. Thus, it seems that the researchers are committed to a unilateral model of causal efficiency in which effects are the direct result of the treatment only as it was experienced by the mother. Any effect on the relationship of the dyad is implied from the mother's behaviors.

Current research in mother-infant interaction suggests that assessment of the child's effect on the caregiver yields important information

regarding the nature of the dyad (Bell, 1971; Harper, 1971). Bell (1974) has also discussed the utility of independent measures of caregiver and child as a means of establishing the relationship between individual differences in each on the characteristic interaction pattern. The conclusion is that research directed to questions regarding the dyadic relationship should include multiple measures which assess individual as well as interactional components of the dyad (Clarke-Stewart, 1973, Note 1).

Research Model

The current application of the transactional model to caregiver-child research has raised serious questions regarding interpretations of analysis resulting from causal efficiency or interactional models (Sameroff, 1975; Sameroff & Chandler, 1975). It is argued that the transactional approach may be more appropriate because it most adequately conforms to the complex, reciprocal nature of real world relationships and technological advances in methods of data collection and analysis have facilitated its application (Bakeman & Brown, in press; Lewis & Freedle, 1973; Lewis & Lee-Painter, 1974; Strain & Vietze, Note 2). With respect to mother-infant interaction, at least preliminary validation of the transactional system has been reported over a wide range of behaviors observed at several different times throughout the infancy period (Ainsworth, 1973; Ainsworth & Bell, 1969; Bell & Ainsworth, 1972; Bell & Axelrod, 1971; Goldberg & Lewis, 1969; Lewis & Rosenblum, 1974; Ainsworth & Bichar, Note 3). Therefore, it seems that the optimal approach to the assessment of a specific treatment effect in the mother-infant dyad is a transactional model because it allows for a [illegible]

the context of the ongoing dynamic process of the dyad.

Theory

In the above review of early, extended contact research, several deficiencies have been noted. Perhaps the presence of some of these shortcomings stems from the lack of a specified theoretical position. That is, though there is ethological support for the treatment (Bowlby, 1969) as well as a basic intuitive appeal regarding the common sense quality of the contact intervention, Kennell, Klaus, and associates have not articulated the theoretical construct which they have used to guide their research activity. Moreover, it is difficult to understand how the process of empirical discovery can be undertaken without a unifying theoretical position. The absence of a clearly delineated standard precludes the logical evaluation of plausible rival hypotheses because there is no specified hypothesis to rival. Under such conditions, appropriateness of design as well as interpretation of results become suspect. For these reasons, the absence of a clearly delineated model is construed as a major deficit in the area of early, extended contact research.

Summary

Research in early and extended contact lacks the guiding principle of a specified theoretical orientation. Further deficiencies which are considered to be at least in part related to this primary fault include dependence upon a causal efficiency model and dependent measures which are concerned with the mother to the exclusion of all other dyadic considerations. The qualitative and quantitative aspects of time as a [illegible] contact are confounded. The significance of the [illegible]

a theoretical model, (b) incorporate the reciprocal nature of the transactional perspective, (c) include dependent variables which assess the nature of the mother and neonate separately as well as the character of the dyad, and (d) reflect a design capable of differentially treating the qualitative and quantitative aspects of time.

A Theoretical Perspective

Though much attention has recently been focused on the notion of the competent infant (Friedman & Vietze, 1972; Stone, Smith, & Murphy, 1973), little note has been taken of such capability with respect to effects of early and extended contact. Moreover, it has been demonstrated that neonates are capable of a range of varied accomodative responses which include, for example, differential looking behavior (Fantz, 1967), an ability to regulate sucking behavior on the basis of a two-criteria contingency (Kessen, 1967; Sameroff, 1968), and an apparent ability to synchronize body movement with adult speech patterns (Condon & Sander, 1974). The manifestation of these complex behaviors from birth suggests to Kessen (1967) the possibility of "organized patterns of congenital behavior" as a part of the inherent composition of the newborn. According to this view, structured behavioral schemas which can be reliably assessed are present at birth.

Kessen (1967), referencing a Piagetian ontological system (Flavell, 1963), has portrayed neonate behavior as contingency seeking. In this way infant activity begins the process of attaching significance to environment. Congenitally organized behavior patterns form the basis of assimilative behavior given at birth which serve as precursors to the assimilation-accomodation process associated with the underlying equilibration mechanism of contingency seeking behavior. In this role, these behavior patterns are quite important to the process of behavior change in that they form the templates against which the neonate overlays his

environmental experience. As mismatches occur, behavior change is effected (accomodation); although, as discussed below, too great a disparity will disrupt the assimilation-accomodation process of the infant's contingency seeking behavior.

As the neonate encounters the environment, Sameroff (1971) has theorized that one of two events occur. If stimulation can be referenced within the limited range feedback loop of his established assimilation patterns, the neonate is active. Otherwise, the neonate is reactive, defensively recoiling from stimulation too novel to be accomodated within existing schema. As long as infant and environment are on relatively comparable levels, the infant remains in an active state; however, should the neonate begin to encounter environment which exceeds the limited range feedback loop which supports mutual interaction between the two, a reaction occurs which produces a distressed state of arousal and emotion. These dynamics, as outlined by Sameroff (1971), support Kessen's (1967) contention regarding the presence of organized patterns of behavior in both neonate and environment.

From this viewpoint, the neonate is perceived as a developing being who demonstrates an inherent capacity for engaging and shaping his environment. The reciprocal nature of the neonate-environment relationship is specified in terms of organized patterns of behavior operating in each which, beginning from a limited range, increase in complexity as a result of a mutual assimilation-accomodation process. Congruence between neonatal organization and environmental complexity is specified as the essential point from which the neonate begins his ontogenetic progression. Provided that the limits of the feedback loop are not [illegible], the neonate is able to [illegible]

This effects a gradual expansion of the feedback loop, thereby allowing greater levels of environmental complexity to become involved in the developmental process.

In referencing neonate-environment interaction, the major component of neonatal environment is the mother. Sander (1962) has delineated a theory of mutual stimulus regulation occurring between mother and infant in the first 18 months of life. Korner (1974), noting close correspondence between Sander's (1962) theory and Piaget's stages, has suggested "that appropriateness of a mother's response to her infant is largely determined by the infant's level of neurophysiological development" (p. 117). In addition, recent data from quasi-naturalistic research contrasting caretaking mode and caregiving style have added strength to this construct (Richards & Bernal, 1971; Sander, 1975; Sander, Julia, Stechler, & Burns, 1972; Sander, Stechler, Burns, & Julia, 1970). There appears to be strong agreement between the theoretical notion of organized patterns of congenital behavior, in terms of the response capabilities demonstrated by the neonate, and the empirical data of quasi-naturalistic research. In summarizing his empirical data, Sander (1975) closely parallels the position of the organized patterns of congenital behavior theorist: "greater specificity and stability in initial adaptation may be associated with earlier development of a more differentiated discrimination" (p. 161).

This theoretical position is relevant to contact phenomena because an increase in the amount of time the neonate spends with a single caregiver directly after birth seems to facilitate the specificity and stability of initial adaptation to which Sander (1975) referred. It is widely accepted that "a number of responses in very immature organisms

were relatively quickly altered by experience" (Rheingold, 1967, p. 284), and specific research has demonstrated the synchronization of neonatal movement to adult speech (Condon & Sander, 1974) as well as effects of mothering on infants within 8 to 10 days following birth (Richards & Bernal, 1971; Sander, 1975). Mothering style reliably differentiated quality of mother-infant relationship through the first year, while individual differences in infants were neither relevant nor reliable predictors (Ainsworth & Bell, 1969; Bell & Ainsworth, 1972; Brody & Axelrod, 1971). However, differences in infant behavior were apparent in relationship to maternal style. There appeared to be a synchrony of interaction between mother and infant behavior in the group of mothers characterized as "sensitive" while infant behavior in the less sensitive mothers' group seemed unrelated to a dyadic interchange process. In light of these findings, the above researchers have proposed notions of maternal sensitivity as the mechanism involved in the establishment of the mother-infant relationship.

In a contingency framework, the sensitive mother may be the mother who most efficiently and appropriately regulates her own behavior specifically so that it remains generally within her infant's assimilative-accomodative developmental limits. Thus, the infant gains greater contingency awareness under this condition because of increased exposure to appropriate stimulation. The contribution of early, extended contact to this approach is that in addition to the specificity of the mother's behavior, an increase in the time of one specific caretaker increases the specificity of the infant's overall experience. As Sander (1975) has hypothesized, early and extended contact contribute to specificity and stability of the infant's experience which facilitates the infant's

discriminatory ability in initial adaptation. Under the conditions of this theory one would expect the development of synchronized, mutual patterns of interaction between mother and infant as each becomes increasingly proficient at maintaining the lines of communication through reaching the other's signals.

Richards (1973) has discussed the communication process between mother and infant in terms of a "mutual phasing of interaction." In this system mother must learn to respect the timing of mutual activity with the infant or risk disruption of the interaction by causing the infant to fuss or engage in other avoidance behavior. In terms of the theory discussed above, such a disruption occurs because the limitations of the feedback loop have been exceeded. Thus, as Richards (1973) has noted, communication may be a better way of describing the mother-infant relationship in lieu of attachment or bonding because the quality of the relationship appears to be based on how well information is processed in the dyad.

Indications of the efficacy of this position are provided by the Ainsworth and Bell (1973) findings that maternal sensitivity to infant needs during the first year of life predicted the level of the child's differentiation in communication skills at 1 year. The strength of this effect is supported by a wide range of data which demonstrated the reciprosity of mother-infant behaviors associated with attachment (Ainsworth & Bell, 1969, 1973; Bell & Ainsworth, 1972; Ainsworth & Blehar, Note 3). A consistent finding of these studies had been that patterns of maternal behavior in the first quarter of the infant's life predicted the strength of the mother-infant relationship at infant age 1 year. Early sensitivity of the mother tended to reinforce the relationship cumulatively over time.

Conversely, a lack of maternal sensitivity served as the precursor to a "vicious cycle" in which inappropriate responding on the part of the mother touched off reactive behaviors in the infant. At infant age 1 year the relationships in these dyads were not as positive as those of the sensitive mother dyads.

These findings, particularly with respect to the influences of maternal behavior on subsequent dyadic interaction, provide evidence for the manner in which organized patterns in the environment relate to infant needs. Congruent with the expectation of the organized patterns theory, successful dyadic relationships begin with a sensitive mother who presents herself to her infant in a manner interpretable to the infant's reference system. From this established base the developing infant actively explores the environment, gradually expanding his parameters from a relatively limited contingency awareness (Watson, 1972) to a broadened competence-oriented network of effect and behavior (cf. Bronson, 1971). Early mother-infant communication appears vital to this process and the sensitive mother described in the above cited literature is, in theoretical perspective, the mother who provides the most efficient communication network between her infant and herself. Her goals are to provide clear signals which have been modulated to the infant's receptive capability and the network fidelity is dependent upon how well the mother meets these goals in the early days of the infant's life.

Organized Patterns of Behavior and Mother

In the preceding discussion the major emphasis was placed on the importance of the mother meeting infant requirements. Though the reciprocal nature of the mother-infant relationship was referred to

throughout, scant attention was paid to aspects of the interaction which produce maternal effects. If the reciprocal model is appropriate, then extended contact should contribute to the mother's participation in the dyad as well.

Unlike the neonate, the postpartum mother brings to the first interaction a history of social interaction which influences her approach to mothering (Klaus & Kennell, 1970; Richards, 1973; Wolff, 1971). Regardless of the vast differences produced in these women as an ongoing process of their own life experiences, certain similarities are apparent in initial reactions to newborns. Most every new mother expresses pleasure upon first sight of her baby (Newton & Newton, 1962) and explores her newborn's anatomy in a manner so uniform that it has come to be viewed as an ethological response pattern (Klaus & Kennell, 1970). Similarity has also been noted in the concerns of postpartum women, particularly primipara, regarding their ability to care for their infants (Adams, 1963; Wolff, 1971). Though the major body of mother-neonate research is equivocal and contradictory, a consensus does appear in the characterization of the postpartum woman as subject to certain common behaviors during the earliest interactional periods with her infant which are not affected by the wide range of individual differences across women. Put another way, the period following birth is when a mother is most likely to pay complete attention to her newborn child.

Considering the 9 months of increasing encroachment upon her own life the mother has invested in the birth of a child, cognitive dissonance theory (Festinger, 1957) predicts not only high interest, but active searching for a rational basis to equilibrate product with investment. It rewards opportunity for proximity between mother and neonate [illegible] them

together during the period when mother's attention is optimally directed to the neonate. Under this condition, supplied by a dissonance resolution motivator, the mother is able to maintain the necessary arousal level vis-à-vis her neonate for the reciprocal process of interactional learning (Escalona, 1968) to occur. Thus, extended mother-neonate contact is important because it allows the dyad to interact during the period mother is optimally aroused and disposed toward the discovery of positive attributes in neonatal behavior and appearance.

Sander (1975) has described mother-neonate adaptation as the point where "the infant's idiosyncrasies of regulation have become coordinated to some extent with the caretaker's idiosyncrasies" (p. 157). The increase in regulation and stabilization of infant behavior which appears to be an effect of extended contact (Sander, 1975) should provide the mother with a more specific context in which to discriminate her neonate's individual idiosyncrasies from random responses. In short, under the extended contact condition, neonate is more "readable" (Korner, 1974). As a function of this increase in readability of the infant, extended contact should facilitate the establishment of contingency awareness between mother and infant. Nuances of infant tonus, skin color, and cry intensity should begin to acquire specific meanings with respect to the nature of the appropriate maternal response. Regardless of individual differences (within reasonable limits) in mothers or neonates, extended contact should reinforce the mother's contribution to the dyad because she is encountering an infant whose behavior is modulated as a function of her continuous involvement during a period when she is most disposed toward that involvement.

[illegible], Rosenberg, and Lind [illegible] found that mothers

experiencing extended contact reported greater discrimination in type and meaning of their babies' cries. Though generated from a questionnaire administered just prior to the mother's discharge from postpartum hospitalization, these data provide limited support for the communication notion. Not only did the extended contact group indicate a better understanding of their neonates' signalling, but they expressed also a higher degree of competence and confidence regarding the performance of their maternal role. Consistent with the above theory, these findings can be interpreted as supportive. Extended contact increases the readability of the infant through initial stabilization of environment. Increased readability of the infant strengthens maternal confidence and competence because maternal actions produce a positive result. Through this reciprocal process of contingency responding the efficacy of dyadic communication is continually reinforced to the mutual benefit of both.

> It is the task of the mother or other care-giver to gear her behavior to the characteristics of the individual infant, neither seeking to make him conform to a preconceived mold nor employing rigid practices without regard for the rhythms, sensitivities, and patterns of this particular infant, and yet finding ways to nudge him away from any undesirable extreme variations from the norm to which he seems constitutionally disposed. (Ainsworth, 1973, pp. 52-53)

Extended contact enhances the mother-infant relationship because it [illegible] opportunity to make adjustments to the other [illegible] that appears to be most conducive for such accomodation. Either [illegible] critical period, the time immediately [illegible]

might be better termed a period of heightened sensitivity that enhances mother-neonate relationships.

Summary

The neonate, biologically endowed with a limited range of organized behavior patterns, engages environment in contingency seeking activity. The quality of neonatal behavior is largely mediated by the level of complexity encountered in the environment. Specific and stable patterns promote continued activity leading to eventual behavioral competence while novelty and complexity produce reactive neonatal behavior. The presence of a single, principal caregiver (mother) as in an extended contact situation promotes stability and specificity in neonatal environmental encounters. Extended contact is also the period when the mother is likely to be most interested in her infant. The combination of these factors leads to the theory that extended contact enhances the mother-neonate relationship because it is under this condition that reciprocal contingent responding is optimalized. Consequently, the neonatal period is perceived as a time of optimal sensitivity in lieu of a critical period for the mother-neonate dyad.

Purpose

The purpose of this study was to assess the effect of differential amounts of early and extended contact between mother and neonate during the normal, postpartum hospitalization period. The relationship between mother and neonate was viewed as a process of mutual regulation and a central aim of this study was to explore the linear quantitative dimension as well as the qualitative dimension of early and extended contact with respect to the development of reciprocity involved in the inchoate dyadic relationship. This resulted in the construction of two orthogonal models:

1. Quantitative early, extended contact. The effect of extended contact is a function of the amount of time mother and neonate are together. The more contact the stronger the effect, regardless of when contact occurs.

2. Qualitative early, extended contact. The effect of extended contact is the result of contact occurring during an optimal period of heightened sensitivity for the mother within the first 3 hours postpartum.

As a more efficient means for approaching the reciprocal aspect of mother-neonate behavior under study, general design considerations were patterned from a transactional perspective (Sameroff, 1975; Sameroff & Chandler, 1975).

Dependent Measures

This study included dependent measures of infant characteristics, maternal characteristics, and dyad characteristics. Infant characteristics were measured directly utilizing the Neonatal Behavioral Assessment Scale (Brazelton, 1973) which provided cluster scores regarding the infant's (a) interactive processes, (b) motoric processes, (c) control of state, and (d) physiological response to stress. A less direct measure of infant behavior was provided by the Neonatal Unit Rating Scale Evaluation (NURSE), a 10-item scale completed by attending nurses which covered infant, mother, and mother-infant interaction items. A shortened form of the Infant Temperament Scale (Carey, 1970) was administered to each mother to assess her perception of her child just prior to leaving the hospital. Dyad characteristics were recorded through direct observation of mother-neonate interaction during the fourth or fifth lying-in feeding. (See Appendices A-E for sample dependent measure items.)

Theory

An increase in the amount of mother-neonate contact during normal postpartum hospitalization facilitates modulation of the idiosyncratic behaviors of each to the mutual benefit of the dyad. This effect is produced through heightened awareness of contingent responding in dyadic communication and is independent of the normal range of individual differences in both mother and neonate which have been assumed randomly distributed across the sample.

Hypothesis 1. Neonates receiving extended contact should [illegible] better than control neonates on the Neonatal Behavioral Assessment [illegible]

reliability of Brazelton measures with infant responses in the dyad. Though Osofsky (Note 4) has inferred from the findings further evidence for infant effects, this interpretation does not preclude the possibility of extension to cover differential contingent responding as the source of stability in the observed behavior. Duchowny (Note 5) found a relationship between self-perceived maternal competence and infant Brazelton scores and Greenberg, Rosenberg, and Lind (1973) reported increased self-perception of maternal competence as a result of extended contact experience. Infants under the treatment condition should manifest better Brazelton scores as a result of increased contingency awareness resulting from the extended contact experience.

Hypothesis 2. Mothers under the extended contact condition should perceive their infants more positively and be more knowledgeable about their infants. Maternal perceptions of the neonate have been found to predict the child's level of risk at age 4 years (Broussard & Hartner, 1970, 1971). From the viewpoint of "continuum of caretaking casualty" (Sameroff & Chandler, 1975), a child at risk reflects to a large degree the caregiver-child relationship. Heightened contingency awareness between mother and neonate should produce more positive maternal perceptions of the neonate because of the reinforcing nature of the dyadic experience. It is predicted that treatment mothers will demonstrate a greater level of involvement and a more thorough knowledge of their neonates by completing more items on the questionnaire. The instrument was adapted from the Infant Temperament Scale (Carey, 1970, 1973) to a shorter form considered more appropriate for neonates. This scale surveys the full range of neonate behaviors and has been modified further [illegible] "is baby." This latter aspect was [illegible]

order to phrase the scale in a manner closer to the conversational range. It was expected that a treatment mother would provide more positive responses regarding "my baby."

Hypothesis 3. The desirable effect of extended contact should be recognizable to persons experienced in mother-neonate relationships, i.e., nurses. The strength of the treatment effect would be greatly enhanced if the efficacy of the procedure also registered on the naive psychological system of the hospital personnel. Though no research precedent has been established, it seemed reasonable to expect persons experienced in mother-infant relationships to possess at least intuitive discriminatory powers regarding mother-neonate characteristics, both independently and within the dyad. Therefore, it was expected that treatment dyads would receive higher ratings on the 10-item Neonatal Unit Rating Scale Evaluation (NURSE) designed expressedly for the purpose of assessing nurse perceptions of mothers and neonates.

Hypothesis 4. Mother-infant interaction during a feeding should consist of a higher frequency of mother and infant behaviors which reflect the stability of the relationship in the extended contact group. Research has demonstrated mother-infant interaction during feeding is predictive of the ongoing mother-infant relationship (Ainsworth & Bell, 1969; Brody & Axelrod, 1971; Richards & Bernal, 1971). Osofsky (Note 4) found that infant behavior tended to remain consistent from neonatal assessment to dyadic interaction. Thus, not only is infant behavior expected to be rated higher during neonatal assessment as discussed above, but behavior of treatment neonates is predicted to [illegible]

Ainsworth and Blehar (Note 3) reported that "tender, careful holding" elicits positive responses to being held by an infant while the converse applies for inept holding by mothers. This finding underscores the above predicted reliability of neonatal behaviors and suggests predictions regarding maternal behaviors. Mothers more sensitive to infant needs are expected to feed with greater efficiency and to engage in more cuddling behavior. Maternal smiling and vocalization have been found to relate to positive mothering (Brody & Axelrod, 1971; Richards, 1973) as have soothing behaviors (Ainsworth & Bell, 1969; Kennell et al., 1974; Klaus et al., 1972) and looking and mutual gazing behaviors associated with enface (Klaus & Kennell, 1970; Klaus et al., 1972; Moss, 1967; Robson & Moss, 1970). To summarize specific predictions under this hypothesis, treatment infants will (a) engage in greater amounts of interactive behaviors, (b) cry less, and (c) remain in alert or contented states more. Treatment mothers are expected to behave toward their infants with more (a) interactive behaviors, (b) feeding competence, (c) cuddling, (d) smiling, (e) vocalizing, (f) soothing, (g) looking, and (h) enface. The presence of a greater proportion of these behaviors is predicted as a function of the effects of a developing pattern of reciprocal behavior between mother and neonate which serves to support the relationship. The condition specified by these variables is believed to be that most conducive to the maintenance of the moderate level of arousal essential to interactional learning (Escalona, 1968).

Method

Subjects

Nearly all primiparas women were selected from the obstetrics ward of a local hospital, a county facility serving a mixed urban-rural, principally indigent population. Following selection many women were dropped from the sample owing to birth complications or incomplete data. The final sample consisted of 104 (53 males and 51 females) normal, full-term infants of birthweights greater than 2,268 grams and their mothers. Permission for these women to participate in the study was sought from them shortly after delivery and confirmed a few hours later to make certain that all information had been clear for both parties. Refusal rate was less than 8%.

The four groups of this study were defined as follows:

1. Control (C). Normal hospital regimen involving mother-infant contact during scheduled feeding only (n = 30; males = 14, females = 16).

2. Initial Contact (IC). Mother-neonate contact for 15 to 45 minutes during the first 3 hours following birth, then normal hospital regimen (n = 22; males = 11, females = 11).

3. Extended Contact (EC). Mother-neonate contact for 10 additional hours daily during normal postpartum hospitalization (n = 30; males = 19, females = 11).

4. Initial Contact and Extended Contact (ICEC). IC and EC procedures combined (n = 22; males = 9, females = 13).

Pursuant with the initiation of the study, two hospital rooms accomodating a total of seven beds were assigned as extended contact rooms. These beds were utilized randomly by all obstetrical patients without regard for parity. Thus, true randomization was attained with respect to the EC condition. IC assignment, however, was more haphazard than random owing to a need for hospital staff to be present with mother and neonate during the contact period. Though this requirement caused the IC group to be almost entirely drawn from day and early evening births, all other conditions for randomness were met in assigning subjects to groups.

Instruments

Neonatal Unit Rating Scale Evaluation (NURSE). The NURSE consists of a 10-item scale evaluating mother, infant, and dyadic qualities (see Appendix C). It was developed for the purpose of this study in order to gain an assessment of mother and neonate from the perspective of the nursing staff. Forms were placed at the obstetrics and nursery nursing stations and floor personnel were briefed regarding the nature of the instrument and asked to complete one form per shift per infant for every healthy, full-term neonate in the hospital during the postpartum lying-in period. This protocol removed the inherent bias potential of focusing attention on only study subjects as well as provided an opportunity to gather standardization data on the NURSE.

Neonatal Behavioral Assessment Scale (Brazelton, 1973). The Brazelton assessment was administered to infants between the ages of 48 to 72 hours. Two male researchers were carefully trained by experienced examiners and certified reliable by them upon completion of the training period. A third examiner was a female researcher with [illegible]

in the Brazelton assessment. Reliabilities among the three possible pairings of examiners exceeded 90% agreement at intervals throughout the data collection period.

Mother-Infant Interaction Observation. Mother-infant codes were defined in terms of five categories: setting, infant state, maternal proximity, maternal behavior and infant behavior. These categories were incorporated from the construct created by Strain and Vietze (Note 2) with some modifications for neonates. Each category was parcelled into 6 to 10 mutually exclusive and exhaustive components to which a numerical code was assigned (see Appendix E). Particular emphasis was directed to equating infant state categorization with the infant states of the Neonatal Behavioral Assessment Scale (Brazelton, 1973) and the inclusion of enface (Klaus et al., 1972) condition within maternal proximity.

The digital encoding of behaviors was recorded via magnetic tape utilizing Datamyte (model DAK-8C) portable observation units. The Datamyte also recorded the time of the observation in 1-second increments which were registered with data entries. Thus, the dyadic interaction was recorded as a timed sequence. Following the observation session, the magnetic tapes were fed into computer memory by a data coupler.

A female observer was trained in the five categories until reaching nearly perfect coding under simulated conditions. Initially, this person was the only observer; however, as the subject population increased, more observers were trained using the technique originated with the first observer. During the 9 months of data collection, a total of five female observers were used. The first observer remained throughout the study and two observers were replaced during the course of the study.

The assessment of inter-observer reliability was [illegible]

changes, the short period of the observation, and the subsequent low frequency occurrences in some categories. Reliabilities for setting, state, and proximity ranged from .43 to .75, .15 to .83, and .24 to .75, respectively. Mother behavior included (a) play-touch (.09 - .25), (b) smile (.42 - .50), (c) vocalization (.28 - .53), and (d) look (.86 - 1.0). Infant behavior proved particularly difficult with respect to reliability measures. In addition to the above considerations, infant behavior tended to remain quite stable during observation. Thus, restricted range further militated against reliability assessment. For these reasons vocalization, smile, and cry reliabilities could not be calculated for infant behavior while looking ranged from 0 to .89.

Infant Temperament Scale--adaptation (MY BABY). The Infant Temperament Scale (Carey, 1973) was reduced from 70 items to 30 items which were more appropriate for neonates. The abrupt character of the items was smoothed to complete sentences, each beginning with "My baby" in an attempt to increase the appeal of the instrument to the mothers. Though the intention was to preserve the original nine scales, three of the original nine were of only one item each (approach, persistence, and rhythmicity) in the shortened version. As with the NURSE, data were collected from the entire obstetrical ward population in order to remove possible biasing and to gain standardization data for the instrument.

Procedure

[illegible] permission had been obtained, [illegible] telling [illegible] the [illegible] [illegible] groups (IT and IUFC) was placed [illegible] room with her infant [illegible] within 4 hours following birth. [illegible] [illegible] were together during this [illegible] approximately [illegible]

treatment as controls (C), while extended contact (EC) and ICEC groups received approximately 10 hours daily of rooming-in.

Infants received the Neonatal Behavioral Assessment Scale at approximately the second day of life (mean age = 51.1 hours). Floor nurses were instructed to complete one NURSE per day and per evening shift for each infant. The mother-infant interaction observation occurred usually during the infant's second day of life on either the fourth or fifth milk feeding following birth. This observation began at the commencement of feeding and ended when feeding ended. The mean observation time was approximately 12 minutes. Finally, the MY BABY was delivered to mothers shortly before their hospital departure by an obstetrical nurse who was selected for her conspicuous (and therefore familiar) presence and non-threatening manner on the ward. This nurse gave the MY BABY to each mother with a brief instruction to "Tell us all you can. We really want to know about your baby."

Subjects were dropped from the study at any point in the protocol whenever medical complications (e.g., hyperbilirubinemia) appeared.

Design

A four (contact conditions) by two (sex of infant) analysis design was used. In the case of the mother-infant observation aspect of the study the design was extended to a 4 x 2 x N repeated measures design in which the conditions of setting, state, and proximity were incorporated as repeated measures. For example, in the case of state, for which five conditions exist, the design was four (contact conditions) by two (infant sex) by five (repeated measures on state). Where sex effects were not apparent in the interaction terms, simple one-way ANOVA designs were

quantitative contact models was carried out by means of orthogonal contrasts. The effect of initial contact as a qualitative factor was accomplished by combining groups IC and ICEC (the two groups receiving initial contact) in contrast to a combination of groups C and EC (the two groups not receiving initial contact). Similarly, the quantitative factor was tested by C plus IC (the two groups not receiving extended contact) versus EC plus ICEC (the two groups receiving extended contact).

A field research project such as this one does not lend itself to traditional analysis of variance methods. Attempts to randomize subject cell assignment within a natural setting as well as the unforeseen pitfalls that produce missed data points once subjects are assigned combine to produce unequal and disproportionate cell frequencies. In order to preserve data interpretation within the traditional analysis of variance construct, Method 2 of the least squares solution detailed by Overall and Spiegel (1969) was utilized as the solution approach.

Results

The first hypothesis predicted that early, extended contact groups would perform better on the Brazelton (1973) assessment. In order to test this assumption as parsimoniously as possible, the 25 scales used in this study (smiling and lability were omitted) were reduced to clusters (Brazelton, Note 6) which summarize the assessment (see Appendix B). Three clusters rate the infant as positive, average, or normal on a scale of 1 to 3 on interactive processes, motoric processes, and the organizational process of state control. Negative scores on the state control cluster are further differentiated to specify either lability or depression and a final cluster indicates whether or not the infant responds to stress (e.g., tremors and startles).

There were no main effects for the three principal clusters on either treatment or sex. However, a significant interaction was found for the interactive processes cluster, F (1, 68) = 6.24, $p \leq .01$. Further analysis with orthogonal contrasts revealed that differences existed between females when comparing initial contact (IC + ICEC groups) to no initial contact (C + EC groups) conditions, F (1, 34) = 4.11, $p < .05$. Initial contact females tended to score slightly better than average on the mean (n = 16, M = 1.94) while the combined groups receiving no contact scored worse than average (n = 20, M = 2.40). There were no differences in males between contact conditions or between males and females within the no contact condition; however, under the contact condition males were more negative (n = 14, M = 2.57) than females

($\underline{n}$ = 16, $\underline{M}$ = 1.94), $\underline{T}$ (28) = 2.85, $\underline{p}$ < .01.

Main effects were also found for both binary clusters of negative state differentiation and response to stress. In comparing initial contact groups to no initial contact groups it was found that initial contact groups (IC + ICEC) were less represented in the stressful responding cluster than the C + EC group, X^2 (1) = 6.05, $\underline{p}$ < .05. Though there were no differences in the proportion of groups qualifying for additional negative state differentiation, the IC + ICEC group tended to be classified as depressed while the C + EC group was characterized by lability, X^2 (1) = 6.30, $\underline{p}$ < .05.

The three measures of infant state during the assessment were analyzed and main effects were found consistent with the initial contact (IC + ICEC) in contrast to no initial contact (C + EC) groupings. With respect to the initial state of the infant at the beginning of the examination session as well as the two (rank ordered) predominate states of the infant throughout the assessment, the infants exposed to initial contact were consistently, significantly lower in state. These data are presented in Table 1.

These findings lead to a partial confirmation of the first hypothesis. Females in the initial contact conditions (IC + ICEC) are the only group on the positive side of the interactive processes cluster. There appears to be a general condition of lowered arousal within the initial contact group (IC + ICEC) in contrast to the no initial contact group (C + EC). This is reflected by the differences in states observed between these two groups during the assessment as well as the findings

arousal level also seems consistent with the finding that initial contact groups are not as reactive to stressful stimuli as those not receiving initial contact. With respect to the state differences and lowered stress responses, these data suggest a profile similar to the notion of moderate arousal which has been forwarded by Escalona (1968). However, the positive effect of this arousal level appears to hold true only for females.

Table 1

Mean States from the Neonatal Behavioral Assessment Scale for Infants Receiving Initial Contact and No Initial Contact

	Group			
Assessment	No IC[a]	IC[b]	F	p
Initial State	2.69	1.83	8.99	.004
Lowest Predominate State	3.78	3.25	8.71	.004
Highest Predominate State	5.31	4.61	12.06	.001

$a_n = 45$

$b_n = 36$

The second hypothesis predicted that mothers in the early and extended contact groups would rate their infants more favorably on the MY [illegible] infant temperament assessment. On this variable, differences were found in terms of both the qualitative and quantitative [illegible] qualitative model, mothers reported lower [illegible]

sex was indicated, F (1, 42) = 4.63, $p < .05$. A post hoc Newman-Keuls analysis of the four means indicated that mothers of rooming females completed significantly more items (n = 12, M = 24.08) than the other three groups (non-rooming-in females, n = 12, M = 14.58; rooming-in males, n = 10, M = 18.80; non-rooming-in males, n = 12, M = 18.25). From the perspective of the qualitative model, mothers who received initial contact reported their babies to be lower in distractibility than mothers not receiving initial contact, F (1, 30) = 4.33, $p < .05$.

The second hypothesis was confirmed. Early and extended contact was clearly related to the number of items completed on the MY BABY and this has been interpreted in terms of maternal investment in the infant. In addition, early and extended contact mothers rated their infants more positively on activity and distractibility which indicated that contact conditions had an effect on the way mothers perceived infant behavior. With respect to the sex differences and differentiation between qualitative and quantitative models, these issues will be addressed below in the context of the overall study.

The third hypothesis concerned the rating of treatment groups by nurses on the obstetrical service. It was predicted that mothers and neonates under the early and extended contact conditions would receive higher ratings from the nurses; however, no differences were found among groups on the basis of NURSE scores. Data were extremely sparse for this aspect of the study. Though it was anticipated that two NURSE forms per dyad would be completed daily by each of the two nurse stations, the total of four forms per dyad per [illegible]

distribution of completed forms and total forms completed was examined and no systematic trend across treatments was found. However, the primary consideration in generalization from failure to reject the null hypothesis should be the limitations resulting from the sparse sampling of data.

Repeated measure ANOVA revealed an interaction between Treatment (initial contact vs. no initial contact) and Infant Behavior, $\underline{F}$ (1, 74) = 7.59, $\underline{p} < .01$. Subsequent Newman-Keuls Multiple Comparison found that initial contact infants spent significantly less time in Visual activity and significantly more time in the relatively inactive behavior category, None. These data are presented in Table 2.

Table 2

Mean Proportion of Interaction Observation Occupied by Infants in the Visual and None Categories of Infant Behavior

	Initial Contact[a]	No Initial Contact[b]
Infant Visual	.09[c]	.28
Infant None	.90	.69

[a] n = 33

[b] n = 43

[c] Newman-Keuls Multiple Comparison [illegible]

[illegible]

though mothers who had not received initial contact spent significantly less time feeding their infants in Feed+ than did mothers receiving initial contact, both groups of mothers spent significantly more time in the Feed+ category than any other categories. In fact, the regular Feed category and None category under Setting were of such low occurrence that they were dropped from the construct. Table 3 summarizes the findings under Setting.

Table 3

Mean Proportion of Time Spent in Three Setting Conditions by Mother-Infant Dyads During an Observation of the Fourth/Fifth Lying-In Feeding

	Initial Contact[a]	No Initial Contact[b]
Craddle/Rock	.05[c]	.12
Caretake	.10	.15
Feed+	.49	.38

[a] $\underline{n} = 33$

[b] $\underline{n} = 43$

[c] Newman-Keuls Multiple Comparison: .05 = .10 = .12 = .15 < .38 < .49, $p < .05$.

Further analysis was performed in an attempt to gain better understanding of the interactional process involved in the dyads. The data were transformed into a transitional (conditional) probability matrix under the conditions specified by Strain (Note 1). Following Strain's [illegible] mother and infant vocalizations were analyzed at 1 second intervals [illegible] first order transitions [illegible]

possible events: BV, both mother and infant vocalizing; MV, mother alone vocalizing; IV, infant alone vocalizing; NV, neither mother nor infant vocalizing. This matrix is depicted in Figure 1.

(t) ANTECEDENT		(t + 1) CONSEQUENT BV	MV	IV	NV
	BV	1	2	3	(4)
	MV	5	6	(7)	8
	IV	9	(10)	11	12
	NV	(13)	14	15	16

Figure 1. Transitional matrix for vocalization behavior between mother and infant from antecedent time t to consequent time t + 1.

From Figure 1 it should be apparent that each cell in the matrix is the probability of the occurrence of one of the four vocal conditions at t + 1 given the occurrence of the vocal condition at t. Thus, an entry in cell · would indicate the probability of both mother and infant vocalizing (BV) at t + 1 as a consequence of infant alone vocalizing (IV) during the antecedent period t. In addition, it should be noted that the probability of an event remaining the same is inversely related to the size of the interval from t to t + 1. With a 1 second interval, this probability is quite strong and is reflected in the diagonal indicated by the underscored cell numbers. The opposite diagonal, cells [illegible] cell numbers in parentheses, is [illegible] with [illegible] results from the inability of [illegible] more than one transition step per t + 1 [illegible]

be coded to each's respective None vocalization behavior pattern simultaneously. The requirement for separate entries for each change in any of the five categories precludes this possibility.

In addition to the vocalization matrix, a response matrix was constructed using the four possible response events in place of vocalization events. The matrix is computed through the identical process reported by Strain (Note 7) as elaborated above, and has been utilized by Bakeman and Brown (in press). For the purposes of this matrix, all Mother Behavior and all Infant Behavior events are included to form the four possibilities: BR, both mother and infant responding; MR, mother alone responding; IR, infant alone responding; NR, neither mother nor infant responding.

Within the transitional matrix for vocalization, no differences were found. However, in examining the proportion of time spent in each of the four possible categories, a three-way interaction across Treatment (initial contact vs. no initial contact) by Sex by Vocalization categories was found, $F(1, 72) = 5.41$, $p < .05$. Of the four possible events, BV and IV were extremely low frequency behaviors and therefore were dropped from analysis. The relationship of MV and NV are displayed [illegible] Further analysis with Newman-Keuls Multiple Comparison [illegible] time was spent in MV and more time was spent in NV [illegible] with male infants and dyads with female infants. [illegible]

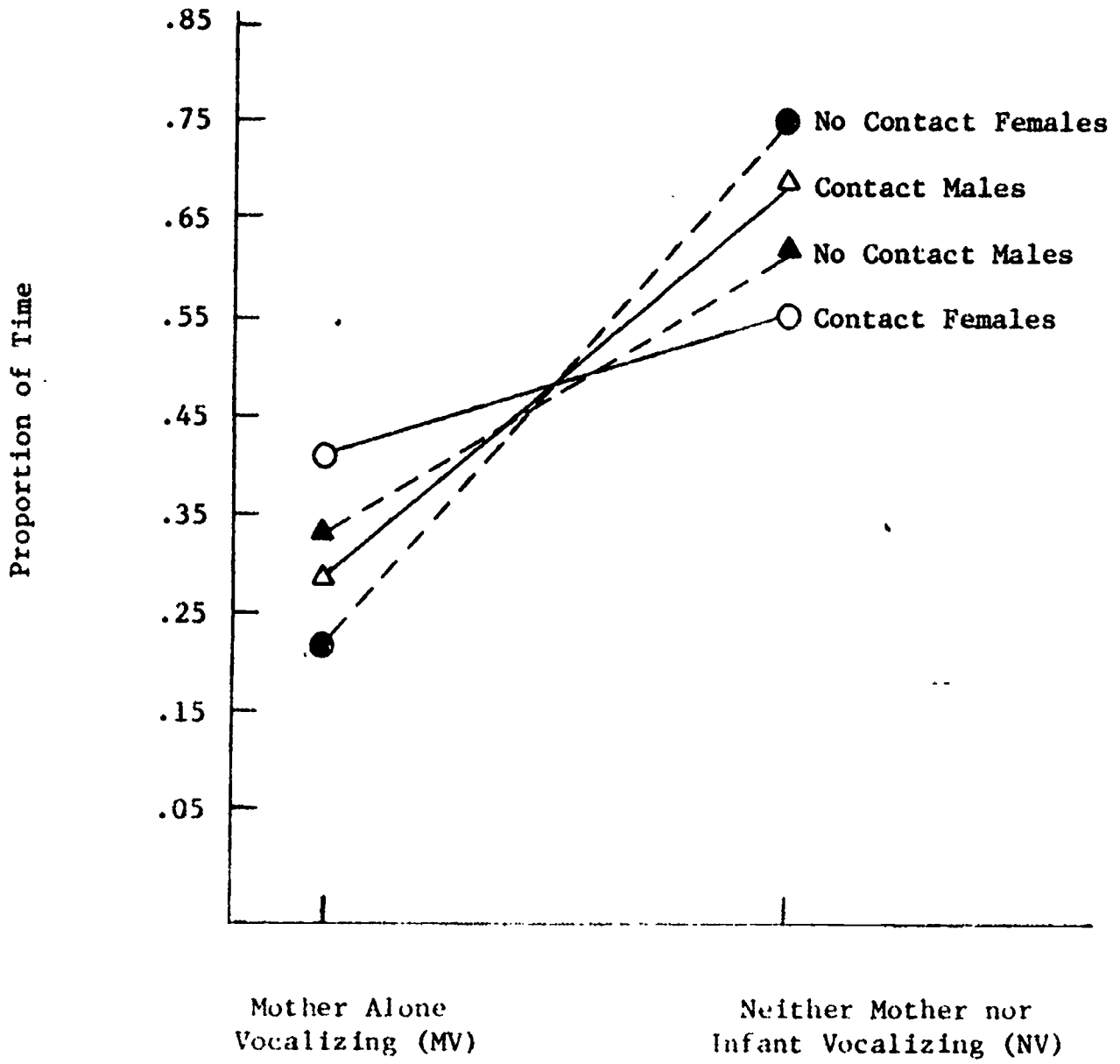

Figure 2. Proportion of time spent in mother alone vocalizing (MV) and neither mother nor infant vocalizing (NV) for mothers and infants [illegible] an observation of the fourth/fifth lying in feeding.

Table 4

Newman-Keuls Multiple Comparisons of Mean Proportion of Time Spent in Two Vocalization Conditions by Mothers and Infants During an Observation of the Fourth/Fifth Lying-In Feeding

	Mother Alone Vocalizing (MV)				Neither Mother Nor Infant Vocalizing (NV)			
Treatment Group	No Contact	Initial Contact	No Contact	Initial Contact	Initial Contact	No Contact	Initial Contact	No Contact
Sex	Females	Males	Males	Females	Females	Males	Males	Females
	N = 18	N = 13	N = 25	N = 20	N = 20	N = 25	N = 13	N = 18
Mean	.23	.28	.33	.41	.56	.63	.70	.75

Analysis of the response matrix yielded a Treatments by Responses interaction, F (2, 296) = 3.78, $p < .01$. As in the case of the vocalization analysis, low frequency events were excluded. The relationship of the transitional events included in the analysis are depicted in Figure 3. Newman-Keuls Multiple Comparisons confirmed the significant relationship apparent in the BR to BR cell. The probability is much greater that BR will be maintained with dyads receiving no initial contact in comparison to dyads receiving contact. Additionally, BR to BR and NR to NR are equally and highly probable for dyads in the no initial contact group while initial contact dyads show a much greater probability of NR to NR than BR to BR (see Table 5).

Finally, analysis of the mean proportion of time spent in one of the four response patterns produced a Treatments by Responses interaction, F (1, 74) = 7.94, $p < .01$. In this case IR and NR were excluded from analysis due to low frequencies. The remaining two patterns, MV and BV, were clearly discriminating with respect to dyads in the initial contact treatment and those which were not. As can be seen in Table 6, initial contact dyads engaged in less BR and more MR. Though MR was significantly higher than BR for both groups, in contrasting the two treatment conditions MR was higher for the initial contact dyads. Conversely, BR was significantly lower for initial contact dyads in comparison to dyads not receiving initial contact.

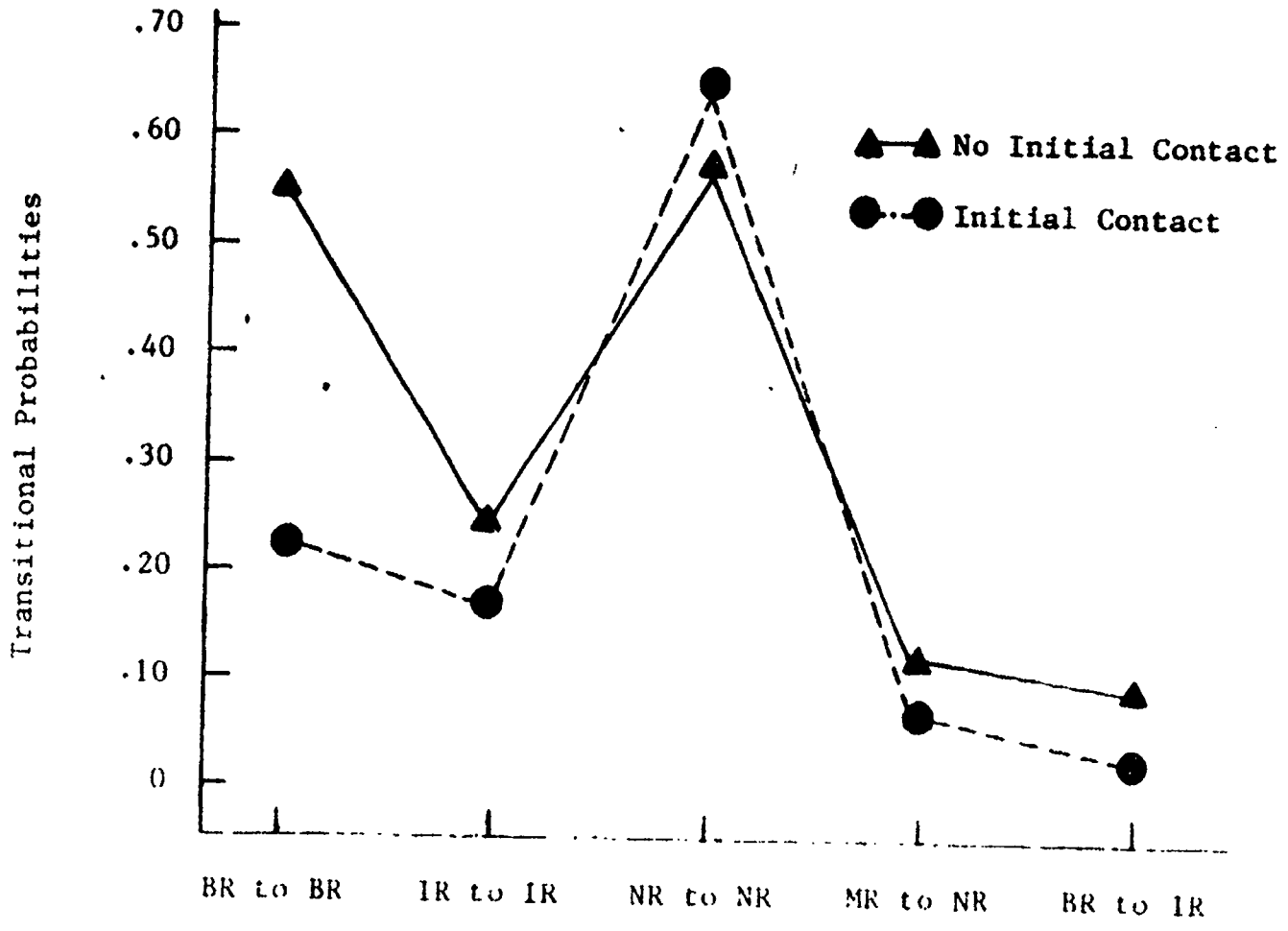

Figure 3. Transitional probabilities of dyadic responding patterns derived from an observation of the fourth/fifth lying-in feeding.

Table 5

Newman-Keuls Multiple Comparison of Mean Transitional Probabilities of Dyadic Responding Derived from an Observation of the Fourth/Fifth Lying-In Feeding

Treatment Group	Initial[a] Contact	Initial Contact	No[b] Contact	No Contact	Initial Contact	Initial Contact	No Contact	No Contact	No Contact	Initial Contact
Response Pattern: Antecedent to Consequent	BR to IR	MR to NR	BR to IR	MR to NR	IR to IR	BR to BR	IR to IR	BR to BR	NR to NR	NR to NR
Mean	.02	.09	.10	.12	.16	.22	.25	.55	.57	.63

[a]For all initial contact groups n = 33.

[b]For all no contact groups n = 43.

Table 6

Newman-Keuls Multiple Comparisons of Mean Proportion of Time Spent in Both Mother and Infant Responding (BR) and Mother Alone Responding (MR) During an Observation of the Fourth/Fifth Lying-In Feeding

	Both Mother and Infant Responding (BR)	Mother Alone Responding (MR)
Initial[a] Contact	.09[c]	.85
No[b] Contact	.28	.66

[a] n = 33

[b] n = 43

[c] Newman-Keuls Multiple Comparisons: .09 < .28 < .66 < .85, $p < .05$.

the no contact group. Infants receiving initial contact exhibited less visual activity and more None. In the response matrix NR was the most probable condition for initial contact dyads while dyads not receiving initial contact were significantly more likely to engage in BR than initial contact dyads. Though [illegible] was higher for initial [illegible]

probability in the BR to BR pattern of the response matrix.

Summarizing the results, the major finding was the prevailing utility of the qualitative model as the means for differentiating early and extended contact. Under the first hypothesis it was found that female infants receiving initial contact were higher on the Brazelton assessment interactive cluster. In addition, initial contact infants were uniformly less likely to show a stress response and were lower in the three measures of state throughout the assessment. In cases of negative assessment, initial contact infants were more likely to exhibit depression rather than the more probable labile condition of infants not receiving initial contact. Though both qualitative and quantitative aspects of early and extended contact were apparent in testing the second hypothesis, the general trend of lowered arousal levels in infants receiving some form of the contact condition was reflected in the mother's ratings of these infants. Rooming-in infants were perceived as less active by their mothers than non-rooming-in infants, while initial contact infants were perceived as less distractible than infants not receiving initial contact. In addition, rooming-in mothers of females completed more items on the MY BABY.

The third hypothesis regarding the ratings of the dyad is not

initial contact appeared to be much less interactive, spending greater proportions of time in the inactive categories.

On the basis of these findings it is concluded that early and extended contact produces positive effects on the Brazelton Neonatal Behavioral Assessment Scale and the way mothers perceive their infants' behavior as reflected in the MY BABY ratings as well as the number of items completed. No effects were noted with respect to NURSE ratings, and the interesting findings with respect to the mother-infant observation could not be construed in terms of the original hypothesis.

Discussion

The most surprising aspect of this study was the consistency with which the qualitative model fit the data. In all cases of direct observation, the distinction between dyads receiving initial contact and those which did not receive initial contact proved to be the discriminating factor with respect to group effects. Moreover, regardless that observation reliabilities were low and durations of initial contact and feeding observations were quite short, significant differences between dyads receiving initial contact and dyads not receiving initial contact were present. Additionally, the apparent applicability of both qualitative and quantitative aspects of early, extended contact with respect to mother's reports of their infant's temperament suggests that dimensions of the quantitative model exist which are not readily accessible through the means of the observational techniques utilized in this study. Thus, to some extent, there appears to be an interaction between the type of data collected and the model which best describes effects. On this [illegible], further research should continue to explore the relationship of [illegible] models; however, the exclusive conformation of data gathered [illegible] constitutes the strongest evidence to date [illegible] this period of mother following birth.

fetus place the pregnant female in a state of conflict because in order to support the latter, the former must undergo change. This aspect of pregnancy has been theorized as manifest in episodes of fantasy regarding the fetus and the emotional lability frequently associated with pregnancy (cf. Bibring, 1959; Wolff, 1971). From the perspective of dissonance theory (Festinger, 1957), it was posited that dissonance resolution activity may be directly related to the length of the period of pregnancy. The longer a female is pregnant, the greater her needs become to justify the increasing encroachment upon her physical and mental being by the developing fetus. This process culminates with a crescendo of physical and psychological trauma for the pregnant female, birth.

The period from conception to parturition requires that the mother's experience of the infant undergo a gradual metamorphosis from almost purely subjective to an experience which becomes increasingly objective. Just as the developing infant undergoes a process of ontological progression which begins with the "transitional phenomena" that prepare the way for the transitional object as "the first not-me possession" (Winnicott, 1953), analogy is apparent in the process by which [illegible] make the transition from the identity of the [illegible] own identity to a differentiated [illegible]

phenomena take the form of signs of life produced by fetal activity. At birth, the subjective illusion becomes a more objective form, imbued with a blend of maternal subjectivity and objectivity, an infant.

A newborn infant requires, according to Winnicott (1953), a mother who makes an "almost 100 per cent adaptation" in order to insure a foundation of total subjective security (illusion) as a basis for the infant's inchoate ontological development. From this base, the infant will build sufficient security to tolerate the erosion of this total subjective existence through encounters with transitional phenomena and finally the first "not-me" transition object which firmly initiates subject-object differentiation. However, in order for the mother to reach a level of "almost 100 per cent adaptation" it follows that she must first have made a transition regarding her experience of the infant. This involves a transition from an essentially subjective experience of the embryo to an increasingly objective experience of the newborn and may evolve from a process very similar to the developmental progression detailed for the infant.

"The transitional object and the transitional phenomena start each [illegible] off with what will always be important for them, i.e., a [illegible] area of experience which will not be challenged" (Winnicott, [illegible], the "neutral area of experience" is an important [illegible] development of ontology in Winnicott's [illegible] respect [illegible]

also be a feeding situation, the neutrality of the experience is violated by the task requirements. The mother must immediately relate to her infant in an objective manner without ever having had a time to experience her infant through a transitional phase of neutrality. The neutrality of the initial contact encounter may provide the mother the means by which she can prepare for the imminent objective existence of her infant through a process very similar to that by which the infant gains access to object awareness. Through initial contact, the infant is experienced as a transitional object by the mother which she encounters during this time as something neither conceived of within her (subjectivity) nor presented to her from without (objectivity).

Further evidence for the analogy between early developmental learning and the transitional stage from pregnancy to motherhood is apparent in the way in which a typical mother traces tactilely the limbs and body of her newborn (Klaus & Kennell, 1970). This process closely resembles the initial stage of sensory-motor learning described within the Piagetian construct of developmental ontogeny (Flavell, 1963). The systematic exploration of the infant may initiate the formation of the basic schemata which serve the process of the female's transition from the subjective experience of infant as part of her to the increasingly objective [illegible] of the infant's existence. As this exploration is [illegible]

Returning to the findings of this study, with the added confidence of previous reports of mothers as prime movers in mother-neonate dyads (Bakeman & Brown, in press; Brown, Bakeman, Snyder, Fredrickson, Morgan, & Hepler, 1975), it seems reasonable to attempt to order these results in terms of indicators of maternal adaptability. In this way it may be possible to gain insight into the possible appropriateness of the theorized mechanism involved in initial contact.

Data from the feeding observation indicated that initial contact mothers engaged in greater amounts of feeding. Also, initial contact dyads were more likely to be involved in the mother only responding (MR) pattern than dyads not receiving initial contact. The latter were more likely to be engaged in the both responding pattern, BR. In the response matrix initial contact dyads were lower in the BR to BR cell and were significantly more likely to be engaged in the inactive pattern, NR to NR. Dyads who received no initial contact were equally likely to be in either BR to BR or NR to NR. Thus, it appears that initial contact dyads were most characterized by mother alone patterns or inactivity while dyads not receiving initial contact were mostly in a pattern where both mother and infant were active.

Though co-activity has been demonstrated as an important aspect of [illegible]

at least plausible that the increased patterns of both mother and infant acting for dyads receiving no initial contact could be the result of an inability of these mothers to meet the specific needs of their infants as efficiently as the mothers in the initial contact condition. That is, mother and hungry infant may be struggling over the bottle.

The finding that differences did not exist among mothers' behaviors, specifically, but were present in mothers' interactional patterns, suggests that the relationship of these factors is quite complex. In order to begin to isolate the relevant factors involved it appears that the feeding observation period should not vary with length of feed, ending when feeding is completed, but should be extended over a fixed period of time (Bakeman & Brown, in press). In this way questions could be addressed regarding the patterns of behavior prior to and following feeding. It is difficult to interpret the findings of this study beyond the speculation involving the initial contact model because the consequences of the observed sequences cannot be presented in light of a continuum of interaction which includes feeding.

This study supports the existence of a sensitive period following birth. Findings indicate that initial contact is associated with a generally lowered activity state as well as increased mother only patterns during mother-infant interaction for the initial contact condition. The effect is also apparent in separate assessment of initial contact [illegible] who remain in lower states and tend to be neither attracted nor [illegible] to infant [illegible] initial contact. Result[illegible] [illegible] [illegible]

Though evidence for the mechanism involved in the initial contact process has been elaborated, this should be regarded as speculative, serving as the point from which further inquiry into contact phenomena should begin.

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[illegible]

Appendix A

BRAZELTON SCORING SHEET

Name: _____ Date: _____

Birthdate: _____ Length of test: _____

Age: _____ Initial state: _____

Race/Sex: _____ Predominate State (1): _____

Birth weight: _____ Predominate State (2): _____

Gestation: _____

Aversive Reactions

Uncover ____
Pinprick ____
Pull-to-sit ____
Undress ____
Prone ____
Defensive ____
INR ____
None ____

Orientation

IV(ball) _____
IA(rattle) _____
AV(face) _____
AA(noise) _____
AVA(f & v) _____

State Changes (count 1 for each two state move) _____

Scale (Note State)	Score (0-9)
1. Response decrement to light (1,2,3)	
2. Response decrement to rattle (1,2,3)	
3. Response decrement to bell (1,2,3)	
4. Response decrement to pinprick (1,2,3)	
5. Orientation inanimate visual (4)	
6. Orientation inanimate auditory (4,5)	
7. Orientation animate visual (6)	
8. Orientation animate auditory (7)	
9. Orientation animate visual & auditory (8)	
10. Alertness (9)	
11. Consolability	
12. Peak of excitement	
13. Rapidity of buildup	
14. Irritability	
15. Tremulousness	
16. Startles	
17. Lability of skin color	
18. Lability of states	
19. Self-quieting activity	
20. Hand to mouth facility	

Appendix B

A Priori Profiles for the Brazelton Neonatal Assessment

Aim

To cluster items on deminsional scales so that a minimum number of variables can be used to summarize the individual infant's performance and to compare outcomes across infants and within the same infant over time.

Underlying Conceptualization

Four conceptual dimensions were selected to summarize the basic processes underlying the infant's behaviors as observed and scored using the examination. These are:

I. Interactive processes. The infant's capacity to respond to social or potentially social stimuli, especially during the alert state. The orientation items, cuddliness and consolability with intervention, were selected to evaluate this dimension.

II. Motoric processes. The infant's ability to maintain adequate [illegible], to control motor behavior, and to perform integrated motor actions.

Criteria for Dimensional Typologies

For Dimensions I, II, and III, three typical typologies of scores on relevant items are defined; for Dimension IV, a dichotomy into "yes" or "no" is used. The typology labeled 1 or "no" characterizes exceptionally good performance; a 3 or "yes" indicates "worrisome" or markedly deficit performance. The 2 is a characterization of the "average" infant's performance and will probably be used to describe about 50% to 60% of infants in a normal nursery population.

Within each typology, there are some criteria which must be met (e.g., to be assigned a 1 on Dimension I, interactive processes, an infant's alertness score must be a 6 or above). Other criteria are not necessarily met by each infant in a typology, for some criteria are established as "either/or." For example, an infant may fit into typology 1 on Dimension II, motoric processes, if he fits the must criteria and if he displays 3 of 4 other behavioral scores indicating very good control of specific motor actions. Thus, he may not need to show nondirect [illegible] swipes or better (7, 8, 9) on the defensive reaction if he received [illegible]

Profiles

After each dimension is coded, four typologies for each examination are obtained. This makes up the profile for that infant on that examination. Fifty-four profiles are possible, each defining a different type of examination and infant. These profiles can then be compared across groups of infants, or by infant over days.

Justification

The use of a priori clusters on multivariable data (a) presupposes knowledge of the dimensions being investigated, and (b) demands that they are truly a priori--not post hoc--for the data set they are to be used on. I think we conform to both.

Their benefits for the Brazelton scale are numerous. Unlike factor analysis, we do not have to assume that all the scales are consistent both in the directionality of the scale or in the "spacing" between particular scale points. Nor are all the scales weighted equally, or are the relative merits of each description defined solely on a numerical basis. In other words, they allow us to assess each item's scale [illegible] prior to numerical transformation.

[illegible] permit [illegible]

Appendix C

Neonatal Unit Rating Scale Evaluation (NURSE)

(Code _____)

Baby _____

Sex _____

Mother's Room # _____

Nurse _____

Neonatal Unit Rating Scale EVALUATION

Instructions: Circle the star which is closest to the statement you think most appropriately describes this mother and baby.

1.	This is a very inactive (passive) mother.	*	*	*	*	This is a very active mother.
2.	This mother needs much supervision and help with her baby.	*	*	*	*	This mother handles her baby with confidence.
3.	This mother and baby seem to fit together well. They understand each other.	*	*	*	*	This mother and child are not very comfortable with each other yet.
4.	This baby feeds well and easily.	*	*	*	*	This baby feeds poorly and with difficulty.
5.	This mother talks to her baby.	*	*	*	*	This mother does not talk to her baby.
6.	This baby has difficulty with routine caretaking (i.e., cries, thrashes or is otherwise distressed).	*	*	*	*	This baby handles rountine caretaking procedures (baths, changes, etc.) with little difficulty.
7.	This mother misses her baby when away (i.e., talks about baby, wants to be with baby, visits the nursery).	*	*	*	*	This mother seems not to miss her baby. (Rarely talks about baby, visits nursery, etc.)

Appendix D

MY BABY

Talking About

MY

BABY

_____ (name)

_____ (hospital #)

_____ (date)

Instructions: Please circle the a, b, or c choice afer each number which best describes your new baby. Tell us all you can, we really want to know about your baby. Thanks, mom!

1. (a) My baby generally takes about the same amount of milk at each feeding.
   (b) Sometimes my baby takes about the same, sometimes different.
   (c) I never really know how much milk my baby will take.

2. (a) My baby is easily distracted from milk feedings by noises, changes in places, or routine.
   (b) Sometimes my baby is distracted, sometimes not.
   (c) My baby usually goes on sucking in spite of distractions.

3. (a) If my baby is hungry and wants milk, he/she will keep refusing substitutes (water, pacifier, etc.) for many minutes.
   (b) Sometimes my baby will refuse for many minutes, other times he/she will not refuse for long.
   (c) My baby usually gives up refusing within a few minutes and takes what is offered.

4. (a) My baby doesn't seem to mind interruptions of milk feedings, as for burping.
   (b) Sometimes my baby doesn't mind interruptions; sometimes she/he does.
   (c) My baby generally cries when feeding is interrupted.

5. (a) My baby has a strong suck.
   (b) My baby has a medium suck.
   (c) My baby has a mild suck.

6. (a) My baby moves constantly (squirms, kicks, etc.) during feeding.
   (b) My baby moves around some of the time during feeding.
   (c) My baby usually lies quietly during feeding.

7. (a) My baby always cries loud and long when hungry.
   (b) My baby cries somewhat when hungry but not usually loud and long.
   (c) My baby usually only whimpers when hungry, but doesn't cry loud.

8. (a) I can usually stop my baby's hunger cry for at least a minute or two by picking her/him up, giving a pacifier, putting on her/his bib, etc.
   (b) Sometimes I can do something to stop baby's hunger cry; sometimes I can't.
   (c) [illegible]

9. (a) My baby seems happy and content after feeding.
   (b) My baby seems okay (content) after feeding but not really happy or fussy.
   (c) My baby seems fussy after feeding and wants to be left alone.

10. (a) During feeding, when my baby is full, he/she will clamp his/her mouth shut or spit out the food and not take any more.
   (b) Sometimes my baby is very active in refusing food and sometimes he/she just turns away or lets the food run out of her/his mouth.
   (c) My baby usually just lets the food run out of her/his mouth or turns her/his head if full during a feeding.

11. (a) My baby usually cries when having a bowel movement.
   (b) My baby sometimes cries during a bowel movement.
   (c) My baby may get a red face during a bowel movement, but he/she usually will not cry and remains content during the bowel movement.

12. (a) My baby has some way to let me know that he/she is soiled with a bowel movement (b.m.).
   (b) Sometimes my baby lets me know about having soiled.
   (c) My baby seldom if ever lets me know she or he has had a bowel movement (b.m.).

13. (a) My baby usually fusses when diaper filled with b.m.
   (b) My baby sometimes fusses when diaper filled with b.m.
   (c) My baby usually does not fuss when diaper filled with b.m.

14. (a) My baby has some way to let me know that he/she has wet (no b.m.).
   (b) Sometimes my baby lets me know about having wet.
   (c) My baby seldom if ever lets me know she or he has wet.

15. (a) My baby usually fusses when diaper is wet (no b.m.).
   (b) My baby sometimes fusses when diaper is wet.
   (c) My baby usually does not fuss when diaper is wet.

16. (a) When my baby fusses about his/her diaper he or she does so loudly. A real cry.
   (b) Sometimes my baby really cries and sometimes not about his/her diaper.
   (c) My baby usually just whimpers a little about her/his diaper.

17. (a) When my baby is fussing about his/her diaper, I can usually stop her/his crying by holding her/him or playing or talking.
   (b) Sometimes I can do something to stop my baby from crying about his/her diaper; sometimes I can't.
   (c) There is nothing I can do to stop my baby from crying about his/her diaper.

18. (a) My baby squirms and kicks and moves around a lot before and during dressing.
   (b) My baby moves around some during changing and dressing.
   (c) My baby is usually still during changing and dressing.

20. (a) My baby usually enjoys taking a bath.
(b) My baby doesn't seem to care one way or the other about taking a bath.
(c) My baby usually cries and/or fusses about taking a bath.

21 (a) Whether my baby likes or dislikes the bath, the feeling is really strong. My baby can really let me know his/her feelings.
(b) Sometimes my baby's feelings about the bath are really stong and others not so strong.
(c) My baby's feelings about the bath are pretty mild.

22. (a) My baby kicks, splashes or wiggles during bath.
(b) My baby moves some but not all the time during the bath.
(c) My baby usually lies quietly or moves little during the bath.

23. (a) My baby had no trouble with baths from the very first one.
(c) My baby had a lot of trouble with the first bath.

24. (a) When I am doing things to care for my baby, he/she is usually pleasant or happy.
(b) My baby doesn't seem to care one way or the other about these things.
(c) My baby usually is fussy or crying when I am trying to care for him/her.

25. (a) There are things I can do while caring for my baby that will stop her/him from fussing like playing, singing, talking, etc.
(b) Sometimes I can do things to stop my baby's fussing; sometimes I can't.
(c) There isn't anything I can do to stop my baby's fussing or crying.

26. (a) My baby usually reacts a little or not at all to an unusual loud sound or bright light.
(b) Sometimes my baby reacts and sometimes not.
(c) My baby reacts to almost any change in light or sound.

27. (a) My baby's reaction to light or sound is strong. My baby will startle and/or cry loudly.
(b) Sometimes my baby's reaction is strong; sometimes not.
(c) My baby's reaction is mild. There is little, if any crying.

28. (a) When light or sound continues to happen, my baby does not react so much any more.
(b) Sometimes my baby continues to react and sometimes he/she doesn't react so much.
(c) My baby keeps [illegible] reacting when the light or sound continues.

[illegible]

Behavioral Sequence Coding

I. Setting Codes

Cradle/fondle/pat/rock to calm or induce sleep	1-0
Bathe/diaper/dress (general caretaking)	1-1
Burp/break/relax from feeding	1-2
Feeding (bottle perpendicular, nipple full)	1-3
Feeding	1-4
No caretaking/attending	1-5
None of the above patterns	1-6

II. Infant State Codes

Sleep with movement	2-2
Groggy, partially awake	2-3
Awake and alert	2-4
Fussy and fidgeting	2-5
Crying	2-6
Sound asleep	2-1

III. [illegible]

V. Maternal Behavior Pattern Codes

Vocalize	5-1
Look at infant	5-2
Look at infant/smile	5-3
Vocalize/look at infant	5-4
Vocalize/look at infant/smile	5-6
Vocalize/tactile stimulation	5-7
Look at infant/smile/tactile stimulation	5-8
Vocalize/look at infant/smile/tactile stimulation	5-9
Tactile stimulation	5-0
None of the above patterns	5-5

VI. Infant Behavior Pattern Codes

Vocalize	6-1
Look at mother	6-2
Vocalize/look at mother	6-4
Distress vocalization	6-5
Distress vocalization/look at mother	6-6
None of the above patterns	6-0